



Aerosol Impact on Surface Radiation and Precipitation in the Subseasonal to Seasonal Prediction Using FIM-Chem-iHYCOM Coupled Model

Shan Sun (1,2), Stuart McKeen (1,2), Georg Grell (2), Li Zhang (1,2)

(1) University of Colorado, Boulder, United States (shan.sun@noaa.gov), (2) NOAA Earth System Research Laboratory

The aerosol direct and semi-direct impact on subseasonal to seasonal (s2s) prediction is investigated using a global coupled atmosphere, chemistry and ocean system of FIM-Chem-iHYCOM. The online chemistry includes a simple suite with bulk aerosols only. Several dozens of year-long experiments were carried out with prescribed sources and sinks for aerosols, fire and anthropogenic emissions during the model integration. The resulting aerosol optical depths from the model are shown to be in good agreement with observations. We also compare the model sensitivity with and without fire emissions at different seasons and against a control run using prescribed background aerorols. Additional emphasis of this work is on the effect of aerosols on surface radiation, cloudiness and precipitation, to demonstrate the importance of using the correct aerosol optical properties at s2s time scale. Overall, these multiple case studies show that the biggest aerosol direct and semi-direct impact from online chemistry is on the radiation budget and less obvious on the cloudiness and precipitation.